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ABSTRACT

This paper provides an early analysis of child care subsidies under welfare reform. The paper reviews the literature on child care subsidies and discusses the potential for such subsidies to be an effective part of the effort to make low-income families economically self-sufficient. The paper then uses data from the National Survey of America's Families (NSAF) to assess: (1) how household characteristics and state subsidy rules and expenditures affect the likelihood of receiving a subsidy; and (2) how subsidy receipt affects employment and welfare participation. Findings suggest that child care subsidies encourage employment and school enrollment among welfare recipients, but not among non-recipients. (A mathematical model of child care use is appended. Contains 51 references.) (EV)

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The Determinants and Consequences of Child Care Subsidy Receipt by Low-Income Families

JCPR Working Paper 213

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Abstract

This paper provides an early analysis of child care subsidies under welfare reform. We review the literature on child care subsidies and discuss the potential for such subsidies to be an effective part of the effort to make low-income families economically self-sufficient. Previous studies of child care subsidies use data from the pre-welfare-reform period, and we discuss the potential difficulties in drawing inferences from those studies that can be applied to the very different post-reform environment. We use new household survey data from the early post-reform period to analyze the determinants of subsidy receipt and the effects of subsidy receipt on employment and welfare participation. The analysis uses data from the National Survey of America's Families (NSAF), conducted by the Urban Institute in 1997. This is the only available national household survey from the post-welfare-reform period that includes information about child care subsidies. The NSAF includes a large number of current and former welfare recipients and other low-income families. State of residence is identified in the NSAF, so we are able merge information on the characteristics and rules of state welfare and child care subsidy programs with the household data.

We use the data to address two issues. First, how do household characteristics and state subsidy rules and expenditure affect the likelihood of receiving a subsidy? Key household characteristics include family size and structure, and past participation in welfare. Second, how does subsidy receipt affect employment and welfare participation? Child care subsidies were received by about 10 percent of the sample. Subsidy recipients were about 2.5 percentage points more likely to be employed than non-recipients, and about 5 percentage points more likely to be employed after controlling for family characteristics. Subsidy recipients were also about eight percentage points more likely to be enrolled in school, no more likely to be unemployed, and about 15 percentage points more likely to be on welfare than non-recipients. The welfare participation difference falls to 10 percentage points after controlling for family characteristics. We cannot determine whether these are causal effects, since there is no source of plausibly exogenous variation in subsidy receipt in our data. Taken at face value, the results suggest that child care subsidies encourage employment and school enrollment among welfare recipients, but not among non-recipients.

The child care subsidy program created as part of the welfare reform of 1996 - the Child Care and Development Fund (CCDF) - is intended to facilitate participation in employment and employment-related activities such as education and training. Thus it is not surprising that a mother is more likely to be employed or in school if she receives a child care subsidy. The guidelines for implementing the CCDF state explicitly that current and former welfare recipients and families at risk of reliance on welfare should have priority for child care subsidies. This may explain why subsidy recipients are more likely to be on welfare than non-recipients.

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1. Introduction

The 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) consolidated four different child care subsidy programs for low-income families into a single block grant, the Child Care and Development Fund (CCDF). The Act also increased funding for child care subsidies, and gave states considerable flexibility in setting subsidy program rules. Furthermore, states were given permission to transfer up to 30 percent of their Temporary Assistance for Needy Families (TANF) block grant funds into the CCDF, and to spend additional TANF funds directly on child care subsidies. These changes indicate that policy makers view child care subsidies as an important part of welfare reform. In fiscal year 1999 states spent all of their CCDF allocation of around $5 billion, and spent directly on child care or transferred another $4 billion dollars from the TANF block. However, we know very little about whether child care subsidies have in fact contributed significantly to the goals of welfare reform.

This paper provides an early analysis of child care subsidies under welfare reform. The paper has two objectives. First, we review the literature on child care subsidies and discuss the potential for such subsidies to be an effective part of the effort to make low-income families economically self-sufficient. Previous studies of child care subsidies use data from the pre-welfare-reform period, and we discuss the potential difficulties in drawing inferences from those studies that can be applied to the very different post-reform environment. We discuss some important issues that arise in designing a child care subsidy: restrictions on the types of child care that can be subsidized; "crowd out" of private child care expenditures and informal unpaid child care; eligibility for a subsidy; and co-payment and sliding-scale fee structures.

The second objective is to use new household survey data from the early post-reform period to analyze the determinants of subsidy receipt and the effects of subsidy receipt on employment and welfare participation. The analysis uses data from the National Survey of America's Families (NSAF), conducted by the Urban Institute in 1997. This is the only available national household survey from the post-welfare-reform period that includes information about child care subsidies. An advantage of household survey data over administrative data is that information is available on both subsidy recipients and non-recipients. Determinants of receipt can therefore be analyzed, and the employment outcomes of recipients and non-recipients can be compared. The survey also includes much more detailed information on outcomes of interest than is usually available in administrative data. The NSAF includes a large number of current and former welfare recipients and other low-income families, providing a basis for reliable inference for the target population of welfare reform. State of residence is identified in the NSAF, so we are able merge information on the characteristics and rules of state welfare and child care subsidy program with the household data.

We use the data to address two issues. First, how do household characteristics and state subsidy rules and expenditure affect the likelihood of receiving a subsidy? Key household characteristics include family size and structure, and past participation in welfare. Second, how does

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subsidy receipt affect employment and welfare participation? In this part of the analysis we attempt to account for the likely possibility that unobserved determinants of receiving a subsidy are correlated with unobserved determinants of the outcomes of interest. The results of the analysis will be useful to policy makers and researchers in understanding the potential contribution of child care subsidies to achieving welfare reform goals.

Section 2 describes the current structure of child care subsidy programs in the U.S., and summarizes information on expenditures and the number of recipients. Section 3 discusses the factors that determine the work incentives provided by child care subsidies and how these incentives are affected by program design. This section also discusses the determinants of subsidy take-up by eligible families. Section 4 reviews existing evidence on the effects of child care subsidies. Section 5 presents descriptive information on child care subsidies, employment, and welfare participation from the NSAF, and section 6 describes the models we estimate. The results of the empirical analysis of subsidy receipt and effects are presented in section 7, and section 8 concludes.

2. Child Care Subsidy Programs

The programs considered here provide subsidies for work-related child care expenses of children in low-income families. We do not consider early education subsidies such as Head Start and Title I-A that are designed to improve child outcomes. Such programs may provide work incentives, but the incentives are clearly different from those of programs explicitly designed to encourage labor force participation.[1]

The history, goals, and main provisions of the major means-tested child care subsidy programs are summarized in Table 1.[2] The 1988 Family Support Act mandated two new programs, Aid to Families with Dependent Children Child Care (AFDC-CC) and Transitional Child Care (TCC). The

[1]See Blau (2000) for a discussion of the work incentives of early education programs.

[2]The Dependent Care Tax Credit (DCTC) has a subsidy rate that declines with the level of income, so this program is means-tested in a sense, though the subsidy rate remains constant for Adjusted Gross Income (AGI) above $28,000. More importantly, however, because the credit is not *refundable* the amount of credit available to low-income families is relatively small. A non-refundable credit is limited to the amount of income tax liability; many low-income families have no federal income tax liability and therefore cannot receive any tax credit. Data from the Internal Revenue Service indicate that one quarter of the total amount of tax credit claimed in 1997 went to families with AGI of less than $30,000, but almost all of this amount was claimed by families with AGI between $15,000 and $30,000; only 1.8 percent of the total was claimed by families with AGI less than $15,000. See Statistics of Income Bulletin, Winter 1998/1999, http://www.irs.ustreas.gov/prod/tax_stats/soi/soi_bul.html. Some smaller programs omitted from the table are listed in U.S. General Accounting Office (1994a) and Robins (1991).

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AFDC-CC subsidy was intended to facilitate participation of welfare recipients in the Job Opportunities and Basic Skills (JOBS) program, an employment/training program mandated by the Family Support Act (FSA) to move families off welfare to economic self-sufficiency. The goal of the TCC program was to help maintain employment by providing subsidies to families who had recently moved off welfare, for up to one year after leaving welfare. The Omnibus Budget and Reconciliation Act (OBRA) of 1990 introduced two more new programs, At-Risk Child Care (ARCC) and the Child Care and Development Block Grant (CCDBG). The ARCC program provided child care subsidies to families who might otherwise not have been able to work and would as a result be at risk of going on welfare. The CCDBG had two goals: provide more funds to subsidize employment-related child care expenses for low-income families, and subsidize quality-improvement activities and consumer education.

The proliferation of programs with different target populations, eligibility requirements, and subsidy rates following passage of FSA and OBRA resulted in a fragmented child care subsidy system. Families would have to switch from one program to another as a result of changes in employment and welfare status, and some families would not be eligible for any subsidy despite having economic circumstances quite similar to those of eligible families. PRWORA consolidated the four programs created by FSA and OBRA into a single child care block grant program called the Child Care and Development Fund (CCDF).[3] The main goal of the consolidated program is to facilitate the transition from welfare to work and help maintain employment of low-income parents. A minimum of four percent of funds must be used by states for quality-improvement and consumer education activities. Federal CCDF funds are provided to the states in three "streams:" discretionary, mandatory, and matching. Discretionary and mandatory funds are distributed according to rules similar to those of the old programs, primarily based on the number of children and state income. These two streams do not require state matching funds. To receive funds from the matching stream, "a state must maintain its expenditure of state funds for child care programs at specified previous levels ('maintenance-of-effort' spending) and spend additional state funds above those levels." (U.S. General Accounting Office, 1998, p. 5). Under the new system, states can (but are not required to) allow a family that moves from

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[3]Three of the previous programs (AFDC-CC, TCC, and ARCC) were authorized and funded by Social Security Title IV-A. They were replaced by the Temporary Assistance for Needy Families (TANF) Child Care Block Grant, funded by the Social Security Act. PRWORA also reauthorized and revised the existing CCDBG program with its own funding. Finally, it stipulated that both the new TANF Child Care Block Grant and the CCDBG be administered by the CCDBG program. The combined program is called the CCDF, and it consists of the two separately authorized funding streams, administered jointly and subject to the same rules (Pitegoff and Bream, 1997). Many documents continue to refer to the joint program as the CCDGB, but the correct name of the combined program is now the CCDF. Most of the information on the CCDF provided here is from the Final Rule issued by U.S. Department of Health and Human Services in the Federal Register (July 24,1998, pp. 39935-98; http://www.acf.dhhs.gov/programs/ccb/policy/fr072498.pdf)

welfare to work to continue receiving a child care subsidy without changing programs.

States can use CCDF funds to assist families with income up to 85 percent of State Median Income (SMI), but are free to use a lower income-eligibility criterion. Parents must be employed, in training, or in school, although some exceptions are permitted. In general, priority for CCDF funds is supposed to be given to families with very low incomes and children with special needs. Specifically, states must use at least 70 percent of their mandatory and matching funds to serve families on welfare, families in work activities who are moving off welfare, and families at risk of going on welfare. These correspond to the three groups previously served by the AFDC-CC, TCC, and ARCC programs, respectively. The CCDF also requires that a substantial portion of the discretionary funds and the other 30 percent of mandatory and matching funds be used to assist working poor families who are not currently, recently, or likely future welfare recipients - the group previously served mainly by the CCDBG program. As part of the general increase in flexibility provided by PRWORA, states are permitted to transfer up to 30 percent of their Temporary Assistance for Needy Families (TANF) block grant funds to the CCDF to be used for child care, and can also use TANF funds directly for child care services without transferring the funds to CCDF. States must use "certificates" (formerly called vouchers) that allow families to purchase care from any provider that meets state regulations and licensing standards or is legally exempt from licensing, including relatives and babysitters. The regulations that govern health, safety, group size, training, and so forth are determined entirely at the state level with no federal requirements, and vary widely across states.[4] States are permitted to impose more stringent requirements for child care services funded by the CCDF, but any such additional requirements must be consistent with the strong provisions of the CCDF requiring flexibility in parental choice of child care (see the Final Rule, Federal Register, July 24, 1998, p. 39986). States can also contract to purchase slots in day care centers and family day care homes and provide such slots to eligible families.

The other main child care subsidy program with an employment focus is the Title XX Social Services Block Grant (TXX). This program subsidizes a wide variety of social services and gives states flexibility in how the funds are allocated across the various eligible services. On average, about 15 percent of TXX funds have been spent on child care in recent years (Committee on Ways and Means, 1998, p. 720). Child care funded by Title XX must meet applicable state standards, and is often provided through "slots" in centers and family day care homes purchased through grants and contracts with state or local agencies.

Table 2 summarizes federal and state expenditures on child care subsidies in recent years, and the numbers of children served by the subsidy programs. The most recent data indicate that about $5 billion in federal and state funds were spent by the CCDF, and another $4 billion were transferred to the CCDF from TANF or spent directly by TANF on child care. Adding the .285 billion from TXX

[4]See http://ericps.ed.uiuc.edu/nccic/statepro.html for information on state child care regulations.

gives a total of about $9.4 billion dollars per year in expenditure on child care by means-tested programs with a work requirement. The figures on the number of children served in the lower part of the table indicate that 1.53-1.76 million children were served in recent years. However, the implied level of funding per child of around $5,100 per year ($9.1 billion divided by 1.76 million children in FY99) seems generally consistent with data on the reimbursement rates shown below.

States have substantial flexibility in designing their CCDF programs, including the income eligibility limit, co-payments by families, and reimbursement rates to providers. These rules are summarized for each state in Table 3. Only nine states set income eligibility at the maximum allowed by law, 85 percent of SMI. Seven states set the income eligibility limit at less than 50 percent of SMI. States are permitted to waive fees (co-payments) for families with income below the poverty line, and there is substantial variation across states in use of this provision. Fees are determined in many different ways, including flat rates, percent of cost, percent of income, and combinations of these. States are required to have sliding scale fee structures, with fees that rise with family income. The reimbursement rates listed in the last column represent the amount of the subsidy exclusive of the family co-payment. Federal guidelines for implementation of the CCDF law require that the subsidy rate be set at the 75th percentile of the price distribution from a recent local market rate survey. Recent evidence suggests that in practice many states use out-of-date market rate surveys or set the subsidy rate lower than the 75th percentile of the price distribution (Adams, Schulman, and Ebb, 1998, p. 23).

The CCDF is a capped entitlement, with no obligation to serve all eligible families. It is estimated that the CCDF served only 12-15 percent of eligible children in recent years (Administration for Children and Families, 1999; http://www.acf.dhhs.gov/news/ccstudy.htm). There is no systematic information available on how CCDF funds are allocated among eligible families. Schumacher and Greenberg (1999) summarize evidence from a number of studies by states of child care subsidy receipt by families who have left welfare in recent years. They report that in most states fewer than 30 percent of welfare leavers who are employed receive a child care subsidy. Lack of awareness of subsidies was reported to be high among these families. The studies also reported that the majority of these families were using informal child care by relatives. Jacobson (2000) also reports low subsidy use by welfare leavers in California.

3. Conceptual Issues

This section discusses the work incentives induced by child care subsidy programs. The main issues are (1) How does the availability of informal (unpaid) child care affect the work incentives of a child care subsidy? (2) How effective are child care subsidies compared to employment subsidies in achieving the goal of economic self-sufficiency? (3) To what extent do child care subsidies crowd out private child care expenditures by mothers who would have worked anyway? Before discussing these issues, it is worth considering the rationale for child care subsidies as a means of encouraging economic independence for low-income families.

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A. Rationale for Work-Related Child Care Subsidies

Child care subsidies can help low-income families be economically self-sufficient. Self-sufficient in this context means employed and not enrolled in cash-assistance welfare programs. Self-sufficiency may be considered desirable for two reasons. First, it may be easier to gain public support for transfers to the poor if they are employed and the transfers are in-kind rather than in cash. Second, self-sufficiency today may increase future self-sufficiency by inculcating a work ethic and generating human capital, and it may therefore save the government money in the long run (Robins, 1991, p. 15). Child care and other in-kind subsidies paid to employed low-income parents may cost the government more today than would cash assistance through TANF. But if the dynamic links suggested above are important, then these employment-related subsidies could result in increased future wages and hours worked and lower lifetime government assistance than the alternative of cash assistance both today and in the future.

There is surprisingly little known about wage growth of low-skill workers, but a recent paper by Gladden and Taber (2000) provides some useful evidence. They analyze wage growth of individuals with at most a high school education, over the first ten years after completing schooling, using longitudinal data from the National Longitudinal Survey of Youth. They find that wage growth rates as a function of labor market experience are very similar for different skill groups. They define skill groups by education (high school dropout versus graduate) and family background (parent's education and income). But the actual wage growth rates with experience are modest for all skill groups, and do not seem high enough to lift low-skill workers out of poverty. High school dropouts averaged 4.4% wage growth per year of actual work experience over the first ten years of work. Thus, if a high school dropout began working at the minimum wage of $5.15, after ten years of work experience her wage rate would have increased to $8.00. This is not negligible but is also not enough to significantly reduce dependence on welfare. Gladden and Taber conclude from their results that "...low skill workers will not have huge wage gains from work experience. There is no reason to believe that forcing them to work will lead to a noticeable effect on the poverty rate."

B. Work Incentives in Child Care Subsidy Programs

Most child care expenditures are made in order that a parent may work. A child care subsidy reduces this work-related expense and therefore increases the net return from employment. In economic terms, child care costs reduce the mother's net wage rate. A higher price of child care increases the likelihood that the mother's net market wage is below her reservation wage (the lowest wage for which she would be willing to work), thereby reducing the likelihood of employment. A child care subsidy raises the net wage, increasing the likelihood of work. The effect of a subsidy on hours of work conditional on employment is theoretically indeterminate because the subsidy has a positive substitution effect and a negative income effect on hours of work. Most child care subsidies have a declining subsidy rate as income rises, and a maximum income level for eligibility. This does not affect the qualitative result that child care subsidies increase work incentives. It does affect the incentive to

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choose any particular level of work hours, and could induce some mothers to reduce hours in order to qualify for a subsidy. Many parents have access to child care by relatives at no monetary cost. Subsidies will influence the tradeoff between paid and unpaid child care, and this may affect the magnitude of the work incentive of a child care subsidy. Restrictions on the quality of child care that can be used with the subsidy will also affect the work incentives of a subsidy. These issues are discussed below.

Unpaid Child Care. Some families have access to care by a relative, including the father and other family members, at no monetary cost. But not all families with access to such care use it, because it has an opportunity cost. For example, the father or other relative sacrifices leisure or earnings in order to provide care. A child care subsidy reduces the effective price of market care but does not affect the price of unpaid relative care, because no money changes hands for such care. A subsidy therefore increases the incentive to choose market child care. Thus, in addition to providing a work incentive for the mother, a subsidy also provides an incentive to use paid care conditional on the mother working. In the presence of an unpaid child care option, a subsidy will induce some women who would have worked anyway to increase use of paid care and reduce use of unpaid care in order to qualify for the subsidy. Thus a subsidy to paid child care "crowds out" unpaid care. A child care subsidy will have income effects on all goods, so the additional expenditure on child care by families who would have paid for care in the absence of a subsidy will be less than the amount of the subsidy. Private child care expenditures are crowded out.

Is a child care subsidy the most cost-effective way for the government to increase employment of low-income mothers of young children? An obvious alternative is a wage subsidy such as the Earned Income Tax Credit (EITC). Child care subsidies are available only if paid care is used, and some mothers will prefer to use unpaid care and pass up the subsidy. This could make a child care subsidy more effective at increasing employment per subsidy dollar spent than a wage subsidy. On the other hand, a child care subsidy will induce some mothers who would have worked anyway to switch from unpaid to paid care, causing an increase in government expenditure with no resulting increase in employment. It turns out that for a wide range of plausible values of the parameters and variables, a child care subsidy that is a given proportion of the child care price generates many more additional hours worked per dollar of government expenditure than a wage subsidy that is the same proportion of the wage.[5] This seems surprising because a wage subsidy appears to be a more direct instrument for increasing employment. But a wage subsidy provides benefits to all working mothers, including those who use unpaid child care, while a child care subsidy provides no benefit to the latter group. It is the reluctance of many mothers to use paid care that makes a child care subsidy a more cost-effective method of increasing employment. If all working mothers used paid care then there would be no difference in the cost effectiveness of the two subsidies if they were set at the same proportional level.

[5]See Blau (2000) for details.

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Quality of Child Care. If the quality of market child care is variable and if the quality of care affects child outcomes, then parents will be concerned about the quality of care they purchase. Most child care subsidies are independent of the quality of care. The CCDF can be used only in arrangements that satisfy state licensing standards or are legally exempt from such standards. Such subsidies can be thought of as being subject to a quality threshold but independent of quality beyond the threshold. A subsidy that is independent of quality has a bigger work incentive than a subsidy that is restricted to high-quality child care. So if the goal of a subsidy program is to facilitate employment, this is best accomplished by the former type of subsidy.

4. Existing Evidence

This section describes evidence on the employment effects of means-tested child care subsidies. The evidence discussed is from three types of studies: evaluations of experimental demonstration projects, evaluations of actual child care subsidy programs, and studies of the effects of the price of child care. The latter type of study does not directly measure subsidies and their impact, but infers the impact of subsidies from the estimated price effects. This type of study is the least direct but by far the most common. The first three subsections focus on evidence pertaining to employment, and the fourth subsection discusses the much more limited evidence available on subsidy take-up.

A. Demonstrations

Several demonstration programs designed to help low-income families achieve economic independence included child care subsidies along with other benefits and services . These programs were evaluated using randomized assignment methods, so the average effects of the programs on outcomes of interest are estimated without bias by simple comparisons of treatment and control group averages. However, in each case the child care subsidy was only one of several services provided as part of the program, so it is not possible to determine how much of the program impacts were due to the child care subsidy. We discuss one example of a demonstration program in order to illustrate the nature of the evidence from such programs.

New Hope was a program intended to reduce poverty among the low-income population in Milwaukee (Bos et al., 1999). It operated from 1994 through 1998 with broad eligibility rules that made virtually anyone with low income eligible to enroll, regardless of employment and family status. The program was voluntary and provided an earnings supplement, affordable health insurance, child care subsidies, and a full-time community service job if no other employment was available. The program required full-time employment (30 hours per week) and provided benefits for up to three years. Participants made their own child care arrangements and were reimbursed for most of the expenses, with a co-payment that increased with family income. 39 percent of participants with children used child care at an average subsidy of $2,376 over two years. An early evaluation based on two years of data from the program found that among individuals who were not employed at entry to the program, participation in the program increased employment by seven percentage points, boosted

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earnings by about $700 per year (13%), raised income by 12%, and had no impact on welfare participation. The program had no statistically significant effects on employment and earnings for those who were employed for at least 30 hours per week at entry, although the sample size was small (the point estimate of the earnings impact was -$571 per year), and reduced AFDC and Food Stamp participation by 7-10% in year two. The program increased use of formal child care by 7.4% for boys and 12.5% for girls, and resulted in improved academic performance, study skills, social competence, and behavior among boys but not girls. [6]

B. Actual Subsidy Programs

Three studies have estimated the impact of actual child care subsidies on employment. Two evaluate means-tested state subsidies for low-income families funded by Federal programs prior to the 1996 welfare reform. The third evaluates the labor supply effects of the implicit child care subsidy provided by free public school. This is not a means-tested subsidy (and is not usually thought of as a child care subsidy at all) but information about its impact could be useful for evaluating the effects of means-tested child care subsidies with a similar structure. In each of these studies the subsidy recipients are self-selected, and the studies recognize and attempt to deal with the possibility of selectivity bias.

Berger and Black (1992; hereafter BB) evaluate the employment impact of two Kentucky child care subsidy programs funded by Title XX in 1989. Both programs subsidized slots in licensed day care centers only, and imposed a work requirement of at least 20 hours per week. One program reimbursed day care centers directly for up to $40 per week, depending on family income, and had an income eligibility limit of 60% of state median income; the corresponding figures for the other program were $50 and 80%. The two programs are treated by BB as a single program. The first evaluation strategy used by BB is to compare employment of single mothers who were subsidy recipients with employment of single mothers who were on the waiting list for a subsidy. A probit equation for employment was estimated on the combined sample of subsidy recipients and individuals on the wait

[6]Other demonstrations and experiments that included child care subsidies were the Teenage Parent Demonstration (Kisker et al., 1998), New Chance (Quint, Bos, and Polit, 1997), GAIN in California (Riccio et al., 1994), the National Evaluation of Welfare-to-Work Strategies, formerly known as the JOBS program (Hamilton et al., 1997; Hamilton, Freedman, and McGroder, 2000), the Minnesota Family Investment Program (Miller et al., 1997), the Florida Family Transition Program (Bloom et al., 1999), and the Gary, Seattle, and Denver Income Maintenance Experiments. The GAIN demonstration excluded children under age 6. Granger and Cytron (1999) report that the effects of the Teenage Parent Demonstration and New Chance (which was also targeted at teenage mothers) on use of center-based child care were smaller than in New Hope and often statistically insignificant. Robins and Spiegelman (1978) estimate that eligibility for a SIME-DIME child care subsidy increased use of market child care by 18 percentage points in Seattle and 14 percentage points in Denver. Results for child care use in the other demonstrations are not available.

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list, with a binary indicator of subsidy receipt the main regressor of interest. Evaluated at the means of other variables the results indicate that the employment rate of mothers on the wait list was 85.5% and the employment rate of subsidy recipients was 97.5%, implying a (statistically significant) subsidy impact of 12 percentage points.

BB recognize that if program administrators select recipients on the basis of characteristics not observed by the investigators, then the waiting list would not be a valid control group for the subsidy recipients. Their second evaluation strategy is to compare the employment of recipients before and after beginning to receive a subsidy. This yields an estimate of the subsidy impact of 8.4 percentage points. This estimate and the 12 percentage point estimate both condition on applying for the subsidy program, which could be correlated with unobserved factors that affect employment. To deal with this, BB drew a sample of single mothers in Kentucky from the May 1988 CPS. They report that the employment rate in the CPS was 47.6% versus 88.6% in their combined sample of recipients and the wait list group. The employment rate of the wait list group *before* entering the wait list was 22.6 percentage points higher than in the May CPS, other things equal, indicating a large self-selection effect on applying to the program. The employment rate of the wait list group was 16.9 percentage points higher after they applied to the program and entered the wait list compared to before entering the wait list. BB suggest that this could be either a selection effect (i.e. their employment rate would have increased even if they had not applied to the program) or an impact of the subsidy as mothers go to work in anticipation of needing to meet the work requirement upon being selected from the wait list.

If the 16.9 point increase in employment of the wait list group after entering the wait list is treated as part of the impact of the subsidy, then the full subsidy effect is 16.9 + 8.4 = 25.3 percentage points from an average weekly subsidy of $45.62. Assuming this was a 100% subsidy and taking the employment rate of subsidy recipients as 97.5 percent, this implies an employment rate of 72.2 percent in the absence of the subsidy, yielding an employment effect of 35% and an elasticity of .35. If the 16.9 is treated as due entirely to selection effects, then the corresponding elasticity estimate is .094 (8.4/(97.5-8.4)). One caveat to generalizing from the study is that the subsidy was available only for use in day care centers, while most current programs provide vouchers that can be used in any paid arrangement. It is also not clear whether Kentucky is reasonably representative of the U.S.

Meyers, Heintze, and Wolf (2000) (hereafter MHW) use data from a sample of California AFDC recipients in four counties to analyze the determinants of receipt of a child care subsidy and the impact of subsidy receipt on employment. Individuals were randomly selected from AFDC administrative records in November 1992, interviewed about 18 months later, and interviewed again 18 months after the first interview. By the time of the second interview 25% were no longer receiving welfare. Those still receiving welfare were eligible for subsidies under a variety of different programs, and assuming that the non-recipients still had relatively low income they were also likely to have been categorically eligible for a subsidy under various California programs. MHW use a sub-sample of 903 single mothers who responded to the second interview to estimate a probit model explaining whether the mother received a child care subsidy conditional on using non-parental child care. The predicted

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probability of subsidy receipt was computed from the estimated subsidy receipt probit for all mothers in the sample, and was used as a regressor in an employment probit. One exclusion restriction (the mother's knowledge of the rules of the child care subsidy system) was imposed on the employment probit in order to identify the effect of subsidy receipt. The predicted subsidy probability has a positive coefficient in the employment probit with a t-ratio of 2.3. Simulations indicate that as the probability of subsidy receipt increases from 0.0 to 0.5, the employment probability rises from .210 to .727 at the sample means of the other regressors. No information on the subsidy amounts or child care expenditures are provided, so an elasticity cannot be computed.

A problem with drawing inferences from this study is that there is no natural control or comparison group available. The authors state "The actual subsidy indicator *S* is observed only among mothers currently using child care, and therefore potentially able to have their child care expenses subsidized. The majority of mothers who are not employed ... do not use child care. Therefore we must anticipate selectivity bias among women for whom *S* is observed; that is, the unobserved factors associated with the receipt of a subsidy are likely to be correlated with the unobserved factors associated with the decision to be employed." (Pp. 12-13). This is certainly true, but in the absence of a useful comparison group, such as a wait list group or the subsidy recipients before they received a subsidy, there is no reliable way to produce estimates that solve this problem.

Gelbach (1999) estimates the impact on employment of the implicit child care subsidy provided by free public kindergarten for five year old children. The structure of the subsidy is like Head Start: free child care of a given quality is provided for a fixed number of hours; and child care outside school hours must be purchased by the family or supplied by informal providers. Gelbach notes that mothers with stronger unobserved tastes for work will be more likely to enroll a child in school at the earliest possible age, making subsidy receipt endogenous. To identify the effect of the subsidy, Gelbach exploits variation in quarter of birth of children and the fact that all states impose a date-of-birth requirement for entry to kindergarten. For example, if a child must have his fifth birthday by December 31 in order to enter kindergarten in the year in which he turns five, a mother whose child was born in the fourth quarter of the year will have access to the subsidy for that school year while a mother whose child was born in the first quarter of the next calendar year will not, independent of labor supply preferences (assuming quarter of birth is exogenous). Gelbach uses quarter-of-birth dummies as instrumental variables for enrollment in public school. He uses data from the Public Use sample of the 1980 census (quarter of birth was not collected in the 1990 census) on 10,932 single mothers whose youngest child was aged five at the time of the census on April 1, 1980.[7] Gelbach's instrumental variable estimates indicate that access to free public school increased the employment probability by five percentage points at the interview date and by four percentage points during calendar year 1979. He also finds positive effects of about 2 on hours of work per week, 3.6 on weeks worked per year, $932 on wage-

[7]Gelbach reports that his IV strategy performed poorly for single mothers with a five year old child and another child younger than five.

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salary income in 1979, and -.04 on the probability of receiving public assistance in 1979. All the estimates are statistically significant. Gelbach was not able to estimate the value of the subsidy, so the elasticity of employment with respect to the subsidy could not be computed. Gelbach's approach is creative and provides credible evidence of the impact of a child care subsidy on employment of mothers whose youngest child is five years old. However, it is unclear whether his results can be generalized to children younger than five.[8]

A final point about these three studies is that the drastic nature of the 1996 welfare reform may make the pre-reform results of these studies less relevant for predicting responses to current and future subsidies. Less emphasis was placed on moving welfare participants into employment before PRWORA. A mother might have been able to turn down a child care subsidy offer before PRWORA and remain out of the labor force without losing her welfare benefit. A mother who turned down a child care subsidy today would be more likely to lose eligibility for welfare. It seems plausible that a mother who is going to lose her welfare eligibility in any case would be likely to accept a subsidy offer and join the labor force. So the results of studies conducted in the pre-PRWORA environment will not necessarily be a good guide to behavior in the post-PRWORA era.

C. Inferences Based on Effects of the Price of Child Care

More than a dozen studies have estimated the effect of the price of purchased child care on the employment behavior of mothers. One of the motivations for this literature is to infer how child care price subsidies would affect employment decisions. Whether inferences about the effects of subsidies drawn from this literature are useful depends on several factors. First, if there are substantial costs to taking up a subsidy, either in the form of time costs required to negotiate the subsidy bureaucracy or psychic costs ("stigma") of participating in a means-tested program, then price effects on employment may not be a reliable guide to subsidy effects. Second, the price effects estimated in this literature are generally assumed to be linear, while most subsidies are nonlinear. As noted above, nonlinearity of a subsidy does not affect the qualitative result that a child care price subsidy will increase employment, but it could affect the magnitude of the employment effect. Thus estimates of linear price effects could be an unreliable guide to the effects of typical nonlinear subsidies. Third, issues of specification and estimation of econometric models of price effects could affect the inferences drawn from such effects.

Table 4 summarizes results from studies of the effect of the price of child care on employment

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[8]There is also the issue of whether results from a universal subsidy are a reliable guide to the effects of a means-tested subsidy. 34% of Gelbach's sample of single mothers whose youngest child was five years old received public assistance in 1979, and average 1979 wage-salary earnings of workers was $5,193. Thus this is a relatively low-income sample that is likely to have been representative of mothers eligible for means-tested subsidies in 1980, so his results do seem useful for predicting the impact of a similarly structured means-tested subsidy.

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of mothers in the U.S.[9] Estimated price elasticities reported by the authors of the studies range from .06 to -1.26. The studies differ in the data sources used and in sample composition by marital status, age of children, and income. Sample composition does not explain much of the variation in the elasticity estimates; the range of estimates is large within studies using the same sample composition. Differences in the data sources also do not appear to account for much variation in the estimates. There is substantial variation in estimates from studies using the same source of data (for example, Connelly, 1992 versus Ribar 1992). Hence specification and estimation issues most likely play an important role in producing variation in the estimates.

The nine studies listed in the upper panel of the table use very similar methods, and are discussed as a group. These studies estimate a binomial discrete choice model of employment by probit. The price of child care is measured by the fitted value from a child care *expenditure* equation estimated by linear regression on the subsample of employed mothers who pay for care. The expenditure equation is corrected for selectivity on employment and paying for care using a first stage bivariate probit model of these outcomes, following Maddala (1983) and Tunali (1986). In order to avoid relying exclusively on functional form for identification, some variables that are included in the child care expenditure equation are excluded from the employment probit in which the fitted value from the expenditure equation appears as a regressor. Also, some variables that are included in the binomial probit selection equations are excluded from the child care price equation in order to help identify the selectivity effects.[10]

Two key problems with this approach are the implicit assumption that all non-parental child care has a monetary price, and the use of household expenditure to estimate price. A substantial share

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[9]Some studies are not included in the table because the elasticity of the probability of employment with respect to the price of child care was not estimated or reported. Some of the latter studies estimated an hours of work or a marginal rate of substitution equation instead of an employment equation (Averett, Peters, and Waldman, 1997; Heckman, 1974; Michalopolous, Robins, and Garfinkel, 1992). Others did not report enough information to determine the method of estimation or the elasticity (Connelly, 1990; Kimmel, 1995). Michalopoulos and Robins (1999) use a pooled sample of Canadian and U.S. families, and Powell (1997) analyzes Canadian data. Michalopulos and Robins report an elasticity of employment with respect to the price of child care of -.156, and Powell's estimated elasticity is -.38.

[10]Exceptions to this general approach among the nine studies include the following. Blau and Robins (1991) estimate the employment probit jointly with equations for the presence of a preschool age child and use of non-relative care. Ribar (1992) estimates the employment equation jointly with equations for hours of paid and unpaid care. Hotz and Kilburn (1994) estimate their binary employment equation jointly with equations for use and hours of paid child care, child care price and the wage rate. The wage, price, and nonwage income variables are not adjusted for taxes and subsidies in any of the studies listed in the table.

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of all non-parental child care is unpaid, but this is not accounted for in the binomial employment model. This model assumes that all mothers behave as if a small increase in the price of child care will make work less attractive. But in fact many mothers are "infra-marginal" with respect to the price of child care: use of informal child care dominates use of paid care for a wide range of values of the price of paid care. Unpaid child care accounts for almost half of all child care used by families with an employed mother and a preschool age child (Blau, 2000). Specifying an employment model under the assumption that paid care is always the relevant non-maternal child care option is thus a potentially serious error. The estimated relationship between the price of child care and employment in this specification will be determined in part by the proportion of the population using unpaid care. If the price of child care changes, this proportion will change, and the estimated price effect would not be a valid guide to the employment impact of the price change. This is a version of the Lucas critique: a structural model could account for the fact that price affects behavior only by changing the utility associated with alternatives in which paid care is used, while a reduced form model cannot account for this.

If the unobserved factors that influence employment and child care behavior are correlated with the unobserved determinants of the price of child care, then estimating a model of household child care expenditures on a sample of mothers who are employed and pay for care yields biased estimates. Most researchers who use this approach have recognized the problem and as noted above have specified reduced form employment and pay-for-care equations that are used to correct the child care price equation for selection effects in a two stage estimation. However, there are no theoretically justified exclusion restrictions to identify the selection effects: the price function is a reduced form, so it contains all of the exogenous variables in the model. Hence the only basis for identification of a child care price equation using consumer expenditure data in a manner consistent with economic theory would be functional form or covariance restrictions. That is, assume that the unobserved factors that influence employment and child care behavior are uncorrelated with the unobserved determinants of the price of care.

The estimated elasticity of employment with respect to the price of child care ranges from .04 to -1.26 in the first nine studies listed in Table 4. Without a detailed examination of specification and estimation differences it is difficult to explain why these estimates are so dispersed. It is possible that some of this variation is due to the two problems discussed here: treating paid child care as if it were the best option for all mothers, and inappropriate exclusion restrictions to identify the child care price equation. Different identification restrictions are used in each study, possibly leading to different degrees of bias. Different data sources containing different proportions of mothers who use paid care are used in each study, and the bias caused by treating paid child care as if it were the best option for all mothers is likely to depend on this proportion.

The studies listed in the lower part of the table attempt to avoid one or both of the problems described above. Ribar (1995) specifies a structural multinomial choice model with a quadratic utility function in consumption, hours of work, and hours of paid care. The discrete outcomes are full-time employment with unpaid care, full-time employment with paid care, part-time employment with unpaid

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care, part-time employment with paid care, and no employment. The standard approach of imposing arbitrary exclusion restrictions on reduced form employment and payment equations is used in order to identify the child care expenditure equation. However, paid child care is *not* treated as if it was the best option for all mothers: the price of child care influences behavior by affecting the utility of the two options in which paid care is used, consistent with economic theory.

Blau and Hagy (1998) specify a multinomial choice model with categories defined by cross-classifying binary indicators of employment and paying for care with a four-way classification of mode of care (center, family day care, other nonparental, and parent). As in Ribar (1995) the price of care affects behavior only by affecting the utility of outcomes involving paid care, so paid child care is not treated as if it was the best option for all mothers. The model is estimated by multinomial logit jointly with equations for hours of work, hours of child care, and several other continuous outcomes. A discrete random effects specification is used to account for the possibility of correlation in the disturbances across the discrete choices and between the disturbances in the discrete and continuous outcomes (Mroz, 1999).

The price of child care is derived from a survey of day care centers and licensed family providers, conducted in the same geographic locations as the survey of consumers. The only source of variation used to identify the price effect is geographic variation in the quality-adjusted price of care. The price of care charged by centers is adjusted by regression for characteristics of the centers associated with the quality of care, such as group size, child-staff ratio, teacher education and training, and curriculum. This approach avoids selection and identification problems inherent in the use of consumer child care expenditure data to measure the price of care, and allows for observed differences across locations in quality. Fronstin and Wissoker's (1995) approach to measuring the price of child care is essentially a special case of this approach in which no adjustment for quality is made.

Blau and Robins (1988) estimate a multinomial choice model of employment and child care decisions by multinomial logit, but the price of child care was included in all of the outcomes in which the mother is employed instead of only those in which paid care is used. This is inconsistent with the theory described above and is equivalent to assuming that paid care is always the best option.

The studies that are most consistent with an underlying framework in which informal care is dealt with appropriately are Blau and Hagy (1998) and Ribar (1995). Both studies produce estimates of the elasticity of employment with respect to the price of child care at the lower end of the range (in absolute value) in Table 7: -.09 from Ribar and -.20 from Blau and Hagy. Blau and Hagy repeated their analysis using consumer expenditure data to measure the price of child care in place of the provider survey data, and estimated an elasticity of -.06 in this case. This could explain why Ribar's estimate is smaller than Blau and Hagy's, since he used consumer expenditure data to measure price. It is risky to generalize from only two studies, but the fact that the two studies that accounted for informal care in ways consistent with economic theory produced small elasticities suggests that the true elasticity may be

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small.[11]

The elasticity of employment with respect to the price of child care may differ across groups. Ribar (1995) uses a sample of married mothers and Blau and Hagy use a sample with married and single mothers, dominated by the former. If the elasticity of employment with respect to the price of child care is different for married and single mothers, then the evidence from these two studies would not be a good guide to price effects for single mothers. Kimmel's (1998) results indicate quite different elasticities for married and single mothers, but Anderson and Levine (2000) and Connelly and Kimmel (1999) produce estimates that are much closer for the two groups. If the elasticities differ substantially with the level of income, then estimates for random samples of the population, as in Blau and Hagy (1998) and Ribar (1995), could be misleading if applied to the low-income population. Estimates produced by Anderson and Levine (disaggregated by education of the mother; not shown in Table 4), Fronstin and Wissoker, and U.S. General Accounting Office (1994b) all show larger elasticities for low-income groups. This suggests that the true elasticity for low-income mothers could be substantially larger than the estimates from Blau and Hagy (1998) and Ribar (1995).

D. Evidence on Subsidy Take-up

Meyers and Heintze (1999) examine the use of child care subsidies in a sample of current and former welfare recipients in four counties of California in 1995. In their sample, 16 percent of employed mothers received a child care subsidy, 30 percent of mothers enrolled in education or training programs received a subsidy, and 34 percent of mothers in neither activity received a subsidy (including Head Start). The public subsidy system for child care in California was quite complex prior to PRWORA, with at least seven different subsidy programs. When mothers were asked why they did not receive subsidies from the programs for which they appeared to be eligible, the majority response for all three employment-related subsidy programs, one out of two education-and-training-related subsidies, and one out of two child-education subsidies was that they were not aware of the program. The majority response for the other two subsidy programs was "aware of the program but did not apply." The acceptance rate for mothers who applied averaged 72% across all programs.

Fuller et al. (1999) estimate a model of the child care subsidy take-up decision of mothers enrolled in TANF using data collected in San Francisco, San Jose, and Tampa in 1998. Of the women in their sample who used any non-maternal child care, 37-44 percent received a subsidy, depending on the site. Presumably, all of the women in this sample were categorically eligible for a child care subsidy, but there is no way to determine whether the mothers not receiving a subsidy were rationed out or did not take up the subsidy offer. A regression analysis showed that a woman's knowledge of child care subsidy rules and participation in a TANF-sponsored job search class were positively associated with receiving a subsidy.

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[11]Preliminary results from a third study that appropriately deals with unpaid child care also show a small price elasticity of employment, for a sample of single mothers (Tekin, 2000).

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5. Data

The National Survey of America's Families (NSAF) was conducted by the Urban Institute between February and November 1997.[12] It was designed to analyze the consequences of devolution of responsibility for social programs from the federal government to the states. The survey was conducted by telephone on a sample derived primarily from random-digit dialing.[13] Residents of 13 states[14] were over-sampled in order to allow detailed within-state analysis, and low-income households (income less than twice the federal poverty level) were over-sampled as well. The full NSAF sample includes 44,461 households. We select a subsample consisting of households headed by an unmarried mother with at least one child under age 13. We focus on single mothers because they are the main target group for welfare reform. After excluding cases with missing data, we have a sample of 4,029 households.

The main variables of interest are child care subsidies, employment status, and welfare status. The respondent (typically the mother) is asked whether she receives any assistance paying for child care, including assistance from a welfare or social services agency, her employer, and a non-custodial parent. We code a family as receiving a child care subsidy if the mother reports that a welfare or social service agency pays for all or part of the cost of child care for any of the children in the family. Table 5 shows that 10.4 percent of our sample receives a subsidy by this measure. The Administration for Children and Families (1999) estimates that 15 percent of eligible families received a CCDF subsidy in 1998. We cannot determine eligibility in our sample, and undoubtedly some of the families in our sample are ineligible as a result of income in excess of the eligibility threshold[15]. So a ten percent subsidy coverage rate is not implausible. Employment is measured by whether the mother is employed

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[12]Another round of the NSAF was conducted in 1999, with a new sample. Data from the 1999 round have not yet been released to the public.

[13]Households without a telephone were also included in the sampling frame. Cellular telephones distributed by the survey organization were used to conduct interviews with such households.

[14]Alabama, California, Colorado, Florida, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, New York, Texas, Washington, and Wisconsin.

[15]The Urban Institute had not released the income data from the NSAF needed to compute eligibility in time for us to use them. These data were released in January 2001, and will be incorporated in a subsequent version of this paper. If a family receives a subsidy through a contract in which a social service agency purchases "slots" in day care centers and assigns them to eligible families, then it is possible that the family would not be aware of receiving a subsidy and would therefore not report a subsidy. This seems unlikely since most families are likely to be aware that child care is normally not free

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as of the survey date, and welfare receipt is measured by whether the family receives cash assistance from AFDC or its successor program TANF as of the survey date. The employment rate is 68.1 percent and the welfare participation rate is 21.5 percent. The NSAF also contains measures of whether the family received welfare in the year prior to the survey date, and whether the family received a child care subsidy during the first three months after leaving welfare since January 1995, if the family was previously on welfare. In some specifications of our models we condition on these lagged dependent variables.

We expect that subsidy recipients would have a higher employment rate than non-recipients, since most child care subsidies are conditioned on employment or employment-related activities such as education, training, and job search. In fact Table 5 shows that the employment rate is 70.3 percent among subsidy recipients and 67.8 percent among non-recipients. This is a surprisingly small difference, and suggests that a substantial proportion of subsidy recipients may be in school, training, or unemployed. To explore this issue, we tabulated the reason for not working offered by the 124 mothers in our sample who received a child care subsidy and were not employed. Forty three percent reported attending school as the reason for not being employed, and another 19 percent reported being unable to find work, actively seeking work, or recently separated from a job. We refer to the latter group as "unemployed" for brevity. The remaining 38 percent reported "taking care of family," and other reasons that seem inconsistent with receiving a child care subsidy that has an employment or employment-related activity requirement.[16] It is not clear why these women are receiving a child care subsidy. One possibility is that their children are in Head Start or some other subsidized preschool program that does not have an employment requirement. The NSAF reports the type of child care used during the month prior to the survey, and includes Head Start as an option. Only eight percent of the mothers who receive a subsidy and are not employed, in school, or unemployed report using Head Start.

In order to examine the effects of child care subsidies on employment-related activities, we analyze several additional outcomes. These include a binary indicator for being enrolled in school, a binary indicator for being unemployed, and a binary indicator for being employed, in school, or unemployed, referred to as being in a work-related activity for brevity. As shown in Table 5, 4.9 percent of the sample are enrolled in school, 5.9 percent are unemployed, and 78.9 percent are in a work-related activity (employed, in school, or unemployed). We also explore the sensitivity of the results to alternative treatment of cases in which a child is enrolled in Head Start.

Subsidy recipients are much more likely to be on welfare than non-recipients, 34.7% versus 20.0%. This is consistent with the stipulation of the CCDF that priority for subsidies should be given to families on welfare, families in work activities who are moving off welfare, and families at risk of going on welfare. The lower panel of Table 5 shows that child care subsidy receipt is almost twice as

[16]The other reasons include ill or disabled, couldn't afford child care, transportation problem, and being in prison.

common for families on welfare (16.7%) compared to families not on welfare (8.6%). However, the employment rate of mothers on welfare is only 25.9 percent compared to 79.7 for mothers not on welfare, so it is not clear that subsidies targeted to welfare families are successful at facilitating employment. Of course what we really would like to know is what the employment rate of welfare recipients would have been had the subsidy receipt rate in this group been lower.

In the analysis we condition on a small set of characteristics of the mother and family, including her age, race, ethnicity, health status, education, presence of children by age, and region. Descriptive statistics for these variables are given in Table 6. The state-level variables used in the analysis include the following characteristics of state CCDF programs: the income eligibility limit as a percent of state median income, the weekly reimbursement rate for an infant-toddler age child, the monthly income level at which the family is required to pay the maximum fee, total federal plus state expenditure per eligible child served, and the percent of eligible children served. Data by state for these variables are shown in Table 3. Other state-level variables include median income, the female unemployment rate, the percentage of children under age five in poverty, and three characteristics of state welfare programs: whether job search is required, the benefit reduction rate, and the income limit for eligibility.

6. Model

Our goal is to model the receipt of a child care subsidy, and the association between subsidy receipt and outcomes such as employment and cash assistance. The econometric model consists of the following pair of equations:

$$S_i = X_i\hat{a} + Z_{S_i}\tilde{a}_S + \ddot{a}_i \qquad (1)$$

$$O_i = \acute{a}S_i + X_i\ddot{a} + Z_{O_i}\tilde{a}_O + \varsigma_i \qquad (2)$$

where S_i is a binary indicator of subsidy receipt, O_i is a binary outcome such as an indicator of whether the mother is employed, X_i is a vector of family characteristics, the Z's are vectors of policy variables and other characteristics of the state of residence of the family, $\mathring{a}_i$ and ς_i are disturbances, and $\hat{a}$, the $\tilde{a}$'s, $\acute{a}$, and $\ddot{a}$ are parameters. We specify linear equations for ease of interpretation, despite the binary nature of the dependent variables. Equation (1) is a reduced form model of the receipt of a child care subsidy. The demand for child care subsidies by families is determined by factors such as the price of child care, nonwage income, the mother's wage rate, preferences for consumption relative to leisure, stigma associated with participating in a means-tested subsidy program, the psychic and time costs of establishing and maintaining eligibility for the subsidy, and so forth. These are determined in turn by observed family characteristics (X), observed features of the state child care subsidy system and the state economy (Z_S), and unobserved family and state characteristics ($\mathring{a}$). However, child care subsidies are rationed because the program is a capped entitlement and is funded at a level too low to serve all eligible families. Thus not all families who demand a child care subsidy receive one. Subsidies are allocated on the basis of observed family characteristics (X), observed features of the state child care

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subsidy system and the state economy (Z_S), and unobserved family and state characteristics (å). Thus (1) is a reduced form - we cannot distinguish the demand effects and supply effects of X and Z_S, just the net effects on subsidy receipt.

Equation (2) is a model of the effect of receiving a child care subsidy on an outcome of interest such as employment. We think of á as the "causal effect" of receiving a subsidy on the outcome of interest. However, this is not a structural model in the sense that á has a well-defined economic interpretation in terms of a behavioral model. We follow this approach for two reasons: we do not have the data needed to estimate the parameters of a behavioral model[17], and this is the approach followed by previous studies of child care subsidies. If all families that receive a subsidy get the same dollar amount of assistance, and if all families have the same response to receiving a subsidy, then á can be interpreted as the ceteris paribus effect of being assigned a subsidy *and* accepting it. This parameter is of interest for descriptive purposes, but is not a fundamental parameter of a behavioral model. The Appendix presents a formal behavioral model of the determinants of child care subsidy receipt and the effect of subsidy receipt on employment. In that model, á depends on both preference parameters and the parameters of the mechanism used by administrators to assign subsidies.

The literature on child care subsidies emphasizes that $å_i$ and $ç_i$ are likely to be correlated. A mother who is strongly motivated to work may also be motivated to seek a child care subsidy, imparting a positive correlation. Alternatively, the least employable mothers may be singled out for subsidies by administrators of the subsidy system, imparting a negative correlation. Unfortunately, there are no plausible identifying instruments available that could justifiably be included in (1) and excluded from (2). One might think that the rules of the state child care subsidy system would affect whether a family receives a subsidy, but conditional on receiving a subsidy would not affect the employment decision. In this case such variables could be included in Z_{Si} but not in Z_{oi}. However, we show in the Appendix that in general this is not true. Rules that determine eligibility affect how much a mother can earn and therefore the value of being employed and receiving a subsidy. And rules that determine the subsidy benefit affect the value of being employed and receiving a subsidy. Hence we cannot claim to produce consistent estimates of á, the parameter of interest. We present Ordinary Least Squares (OLS) estimates and Two-Stage Least Squares (2SLS) estimates with alternative sets of exclusion restrictions. The exclusion restrictions are not well-justified, but we present 2SLS estimates anyway for

[17]We do not have information on the amount of the subsidy, although in principle we could estimate it using the program rules and the relevant family characteristics. However, as noted above the income data needed to compute the subsidy amount were released just a short time ago. The number of children by age were also not released until recently. Also, a structural model would contain the price of child care, the mother's wage rate, and nonwage income. We have substituted the determinants of these variables, so (2) is really a quasi-reduced-form model. This approach allows us to avoid the difficult problems of assigning wages and prices to non-workers and non-payers, respectively. See Tekin (2000) for an analysis that deals with these issues.

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comparison purposes. The estimates of á are inconsistent unless it happens that â$_i$ and ç$_i$ are uncorrelated. Thus our results are subject to the same criticism we made above of the Meyers, Heintze, and Wolf (2000) paper: there is no natural control or comparison group available. Also, the identifying instruments that we use are aggregate state-level variables, and these are likely to be relatively weak instruments for explaining individual-level subsidy receipt.

This model is similar to those estimated in previous analyses of the effects of child care subsidies, although the source of identification is different in each case. Gelbach's (1999) model is identified by quarter-of-birth of five year old children, which affects enrollment in kindergarten, but (by assumption) not employment. Meyers, Heintze, and Wolf (2000) identify the effect of a child care subsidy by excluding from the employment equation an indicator of how well the mother knows the rules of the child care subsidy system. Berger and Black (1992) use several comparison groups to sweep out various fixed effects. Their approach achieves identification through covariance restrictions: the disturbances are assumed to consist of a common fixed effect and independent idiosyncratic components. Sweeping out the fixed effects by assumption removes the source of the correlation between the errors of the subsidy and employment equations.

7. Results

Table 7 presents estimates of equation (1), the model for receipt of a child care subsidy. The first column presents estimates without lagged dependent variables. The likelihood of subsidy receipt decreases with the mother's age until age 43. Blacks are more likely to receive a subsidy than whites and other races (other race is the reference group), and Hispanics are slightly less likely to receive a subsidy than non-Hispanics, other things equal. Mothers who have completed high school are about three percentage points more likely to receive a subsidy than high school dropouts. Mothers with a child aged 0-5 but no child 6-12 are 3.5 percentage points less likely to receive a subsidy than mothers with children in both age groups (the reference category), and mothers with a child 6-12 and no child 0-5 are 9 percentage points less likely to receive a subsidy than mothers with children in both age groups.

The state-level variables appear to have little or no impact individually or as a group. An F-test fails to reject the hypothesis that coefficients on the state-level variables are jointly zero. An alternative specification not shown in the table replaced the state-level variables with state dummy variables. The hypothesis that the coefficients on the state dummies are jointly zero is strongly rejected. This means that subsidy receipt does vary significantly across states, but the state-level variables we use fail to explain this variation. In the second stage results reported below, we compare estimates based on first stage estimates using state dummies with the first stage estimates reported in Table 7. We estimated two other specifications not reported in Table 7. First, we added a measure of total federal and state child care spending per eligible child. The coefficient estimate on this variables was small and insignificantly different from zero. Second, we added a measure of the proportion of eligible children served (from Administration for Children and Families, 1999). The coefficient estimate on this variable

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was .58 (standard error .17) and significantly different from zero. The estimate implies that each percentage point increase in the percentage of eligibles served is associated with a .58 percentage point increase in subsidy receipt in our sample. The estimate is less than one because not everyone in our sample is eligible for a subsidy. This variable seems to have some identifying power, but it is really just a state-level aggregate of the dependent variable, and as such is not an independent source of information. For example, if we ran the regressions reported in Table 7 using states as the unit of observation, the variable would differ from the dependent variable only because of eligibility differences across states, which are already captured by the other state-level regressors.

The second column adds indicators for whether the mother participated in welfare at any time during 1996, and whether she received a child care subsidy upon exiting welfare. Welfare participation in the recent past is associated with a 7.4 percentage point increase in the likelihood of subsidy receipt. Past subsidy receipt is associated with a 33 percentage point increase in the likelihood of subsidy receipt. These results clearly indicate strong persistence over time in subsidy receipt associated with participation in welfare.

Table 8 presents estimates of the effect of receiving a child care subsidy on employment, employment-related activities, and welfare participation. Each row presents estimates of á in equation (2) from a different specification or estimated by a different method. The first row presents OLS estimates from a specification of equation (2) that does not include any state-level variables (except region dummies) or lagged dependent variables. The complete results from this model are given in the Appendix. Receipt of a child care subsidy is associated with a five percentage point increase in the likelihood of employment, an eight percentage point increase in the likelihood of attending school, and no impact on unemployment. The variable "work-related activities" is equal to one if the mother is employed, in school, or unemployed. These three activities are treated as mutually exclusive, so the effect of receiving a child care subsidy on work-related activities is the sum of the three separate effects, or 13 percentage points, as shown in the fourth column. Receiving a child care subsidy is associated with a ten percentage point increase in the likelihood of receiving welfare. The estimates suggest that child care subsidies are associated with greater work-related activities but also greater welfare participation. Most mothers who are on welfare do not work, and vice versa: only 5.6 percent of the sample works and receives welfare simultaneously. Another 5.5 percent attend school or are unemployed at the same time as receiving welfare, so 11 percent of the sample is in a work-related activity at the same time as being on welfare. The fact that receiving a child care subsidy is associated both with increased work-related activities and increased welfare participation probably results from the fact that current and former welfare recipients are intended to receive priority for a subsidy, and the subsidy has a work requirement.

The second row presents results from a specification that includes state-level variables: median

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income, child poverty, the unemployment rate, and several child care policy variables.[18] Adding these variables has very little impact on the estimated subsidy effect, and the state-level variables generally have small effects. The third row is the same as the first row except that it adds lagged dependent variables: welfare receipt in 1996 and child care subsidy receipt following exit from welfare. This increases the effect of child care subsidy receipt on employment from .05 to .11, while the effects on school and unemployment decline a bit. The total effect on work-related activities rises from .13 to .16. Conditioning on these lagged variables may control for some sources of unobserved heterogeneity that are correlated with employment and subsidy receipt. The substantial increase in the effect of child care subsidy receipt on employment suggests that the unobserved variables are negatively correlated with receipt of a subsidy. Adding these variables causes the effect on welfare participation falls to zero. Conditional on past welfare receipt, receiving a child care subsidy does not affect the likelihood of current welfare receipt. This suggests that child care subsidy receipt may not actually cause increased welfare receipt. Rather, child care subsidy receipt is more likely when a family has been on welfare in the past, and past welfare receipt is strongly associated with current welfare receipt. The fourth row is just like the first except for reclassifying Head Start cases as not receiving a subsidy. This has negligible effects on the child care subsidy coefficient estimate.

Row 5 presents 2SLS estimates of the row 1 model, using state dummies as identifying instruments for receiving a child care subsidy. The estimated effects of receiving a child subsidy on employment, school enrollment, and welfare participation change drastically from the corresponding OLS estimates, and the standard errors blow up as well. The estimated subsidy effect on employment is -.25 with a standard error of .21. The effect on school enrollment rises from .08 to .33 with a standard error of .10. Thus despite the five-fold increase in the standard error, we can reject a zero subsidy impact on school enrollment with a high degree of confidence, as in the OLS estimates. The effect on welfare participation rises from .10 to .47 with a standard error of .20. Row 6 replaces the state dummies with state characteristics and child care policy variables as identifying instruments. These estimates are quite different from the row 5 estimates, although the standard error estimates are also large. They suggest a large positive effect on school enrollment, but the other estimates are much too imprecise to warrant any conclusions. Other 2SLS estimates not shown that include the lagged dependent variables and some of the state-level variables in the outcome equations are also highly variable and generally imprecise. State dummies and state-level characteristics turn out to be poor sources of identification of the child care effect, not surprisingly. Thus we place little weight on the 2SLS estimates.

In view of the fact that child care subsidy receipt is associated with both increased employment (and other work-related activities) and increased welfare participation, it is of interest to examine the welfare-employment connection in more depth. To do this, we estimated a multinomial logit model of

[18]In addition, the welfare equation includes the state welfare benefit and whether the state requires job search as a condition for welfare receipt.

choices among various combinations of welfare, employment, and other work-related activities. The dependent variable was defined as follows:

Category	Welfare	Work	Other work-related activity (job search, school)
1	Yes	Yes	
2	No	Yes	
3	Yes	No	Yes
4	No	No	Yes
5	Yes	No	No
6	No	No	No

In this classification scheme, work takes precedence over other work-related activities; if a mother is employed then she is classified in category 1 or 2 regardless of whether she also attends school. Only if she is not employed do we then classify her by whether she is a work-related activity (3 or 4) or not (5 or 6). This scheme allows us to determine whether the effect of receiving a child care subsidy on employment and work-related activities varies by welfare status. The regressors in the model are the same as those in the appendix table, corresponding to the row 1 specification in Table 8. The estimated coefficients on the child care subsidy variable and associated simulation results are shown in Table 9. Four of the five subsidy coefficient estimates are significantly different from zero Child care subsidies are associated with increased employment and work-related activities *conditional* on receiving welfare, but have a small negative effect on employment conditional on not receiving welfare. Child care subsidies have a very small positive effect on work-related activities conditional on not receiving welfare. These results suggest that child care subsidies succeed in increasing employment of welfare recipients but have little impact on employment of non-recipients. The CCDF is intended to give priority for subsidies to current and former welfare recipients, and the evidence presented here indicates that this strategy may be a good way to maximize the employment impact of child care subsidies. But a major caveat to this implication is that we have no sound basis for determining whether the effects we estimate are causal or reflect unobserved differences across mothers.

8. Conclusions

Child care subsidies are an important part of welfare reform, and funding for such subsidies has grown rapidly in the last few years. There is little information available about whether child care subsidies have in fact contributed significantly to the goals of welfare reform. This paper presents evidence on child care subsidies received by single mothers with a child under age 13 from data collected in 1997, the first year of welfare reform. Child care subsidies were received by about 10 percent of the sample. Subsidy recipients were about 2.5 percentage points more likely to be employed than non-recipients, and about 5 percentage points more likely to be employed after controlling for a small set of family characteristics. Subsidy recipients were also about eight percentage points more likely to be enrolled in school, no more likely to be unemployed, and about 15 percentage points more likely to be on welfare than non-recipients. The school enrollment and unemployment differences are

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not affected by controlling for family characteristics, while the welfare participation difference falls to 10 percentage points. We have no sound basis for determining whether these are causal effects, since we have access to no source of plausibly exogenous variation in subsidy receipt. Taken at face value, these figures along with the multinomial logit analysis suggest that child care subsidies encourage employment and school enrollment among welfare recipients, but not among non-recipients.

The child care subsidy program created as part of the welfare reform of 1996 (the CCDF) is intended to facilitate participation in employment and employment-related activities such as education and training. Thus it is not surprising that a mother is more likely to be employed or in school if she receives a child care subsidy. However, the guidelines for implementing the CCDF state explicitly that current and former welfare recipients and families at risk of reliance on welfare should have priority for child care subsidies. This may explain why subsidy recipients are more likely to be on welfare than non-recipients. Welfare participants are much less likely to be employed than non-participants, but the increase in employment associated with receiving a child care subsidy among welfare recipients is larger than among non-recipients. However, our findings do not rule out another interpretation: conditional on employment and other work-related activities, child care subsidies increase welfare participation.

There are several potentially promising avenues for further research on the determinants and consequences of child care subsidy receipt. The most pressing need is for survey data with information on whether families without a subsidy were ineligible, eligible but not offered a subsidy, or eligible and offered a subsidy but did not take it up. This would make it possible to do a more convincing analysis of the causal impact of subsidy receipt. A second useful approach would be to combine survey data with administrative records from the subsidy program, as in Berger and Black (1992). This would provide the possibility of constructing comparison groups, such as families on waiting lists for a subsidy. Finally, an experiment in which eligible families are randomly assigned to receive a child care subsidy may offer the best opportunity to determine the impact of child care subsidies on employment and welfare participation.

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Appendix

We develop a simple model of behavior that can serve as a basis for specifying an empirical model. Assume that a young child requires continuous care by an adult. The mother provides the child care during her leisure hours. During her work and work-related hours she can receive free care from a relative or purchase child care in the market. The relative divides her time between child care and leisure, with employment ruled out. For simplicity, assume that all non-maternal child care is either informal or formal, not a combination of the two. There is direct disutility from receiving a child care subsidy, as a result of stigma. A subsidy can only be received if income is below the eligibility limit *and* the family is offered a subsidy. We focus only on work and work-related activities, but the model could be extended to incorporate welfare as well. A child care subsidy can be received if the mother is employed or if she is not employed but is in a work-related activity such as education or job search. We assume that a mother can either work or be in some other work-related activity, but she cannot do both. We model work-related activities as providing utility, which is an ad hoc way of capturing the value to the mother of future wage increases caused by education, training, and job search. We ignore child care quality, since it is not central to the analysis. The utility function, time constraints, budget constraint, and non-negativity constraints are as follows:

$$U = U(c, R, R_r, a, qs)$$

$$R + h + a = R_r + I = 1, \quad H + I = h + a, \quad IH = ha = 0$$

$$c = Y + hw - pH \qquad \text{if } s=0$$

$$c = Y + hw - (p-r)H \qquad \text{if } s=1, \text{ where } Y + hw \geq E$$

$$0 \leq R, h, R_r, I, H \leq 1,$$

where:

U	=	utility
c	=	consumption
R	=	the mother's leisure hours
R_r	=	the relative's leisure hours
a	=	the mother's hours spent in work-related activities (excluding employment)
q	=	the disutility of receiving a subsidy
s	=	binary indicator of subsidy receipt
h	=	the mother's hours of work
I	=	hours of unpaid child care by the relative
H	=	hours of paid child care
Y	=	nonwage income
w	=	the mother's wage rate

p = the price per hour of child care
r = the subsidy rate per hour of child care
E = the income eligibility limit for a child care subsidy
R = a binary indicator of whether an eligible family is offered a subsidy.

The family chooses h, a, I, H, c, and s to maximize utility subject to the constraints. There are two scenarios to consider. First, suppose the family is either ineligible for a subsidy regardless of hours worked (Y>E) or is eligible but rationed out (Y#E, R=0). In this case s=0 because subsidy receipt is not part of the choice set. The family then faces the following set of discrete alternatives:

(1) not employed (h = I = H = 0);
(2) employed, informal child care (I=h>0, a=H=0);
(3) employed, formal child care (H=h>0, a=I=0);
(4) work-related activity, informal child care (I=a>0, h=H=0);
(5) work-related activity, formal child care (H=a>0, h=I=0);

In alternative (1) there is nothing to choose, while in alternative (2) the mother chooses h, with I, and determined by the choice of h. In alternative (3) the mother chooses h, with H and determined by the choice of h. Alternatives (4) and (5) are analogous to (2) and (3) with a substituted for h.

In the second scenario, the family is potentially eligible for a subsidy and a subsidy is offered (Y#E, R=1). In this scenario the family faces the following set of alternatives:

(1) not employed (h = I = H = 0);
(2) employed, informal child care only (I=h>0, a=H=0);
(3) employed, formal child care, no subsidy (H=h>0, a=I=0, s=0);
(4) work-related activity, informal child care (I=a>0, h=H=0);
(5) work-related activity, formal child care, no subsidy (H=a>0, h=I=0, s=0);
(6) employed, formal child care, subsidy (H=h>0, a=I=0, s=1; Y + hw # E).
(7) work-related activity, formal child care, subsidy (H=a>0, h=I=0, s=1; Y + hw # E).

Alternatives (1)-(5) are the same as in the first scenario. In alternatives (1), (2), and (4) no paid child care is used, so no subsidy is received. In alternatives (3) and (5) the family pays for child care and is therefore eligible for a subsidy, but chooses not to take up the subsidy. In alternatives (6) and (7) the subsidy is accepted and hours of work are low enough so that income does not exceed the eligibility limit.

The value of receiving a subsidy in this model is

$$V(s=1) = \text{Max}\{V_6(Y, E, p, r, w, q), V_7(Y, E, p, r, q)\}$$

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where V_6 and V_7 are the indirect utility functions associated with alternatives (6) and (7). The value of not receiving a subsidy is

$$V(s=0) = \text{Max}\{V_1(Y), V_2(Y, w), V_3(Y, w, p), V_4(Y), V_5(Y,p)\},$$

where V_i is the indirect utility associated with alternative i, i=1-5. A subsidy is received if V(s=1) > V(s=0) *and* Y # E *and* R=1. Otherwise a subsidy is not received. A reduced form model of subsidy receipt derived from this framework therefore has the form s = s(Y, E, p, r, w, q, R).

The probability of employment *conditional* on receiving a subsidy is

$$\Pr(e=1 \mid s=1) = \Pr\{V_6(Y, E, p, r, w, q) > V_7(Y, E, p, r, q)\}$$

The probability of employment conditional on not receiving a subsidy is

$$\Pr(e=1 \mid s=0) = \Pr(\text{Max}\{V_2(Y, w), V_3(Y, w, p)\} > \text{Max}\{V_1(Y),V_4(Y),V_5(Y,p)\})$$

Hence the probability of employment conditional on subsidy receipt status has the form

$$e = e(s, Y, E, p, r, w, q).$$

Notice that this probability does not depend on R, so R is in principle a valid identifying instrument. However, we do not have data on R. Even if data on R were available, it is likely that R would be correlated with unobserved components of preferences and constraints. E appears in the employment model because in alternatives (6) and (7) a subsidy can be received only if earnings plus other income is less than the eligibility limit. And r appears because the value of the subsidy influences the relative attractiveness of employment.

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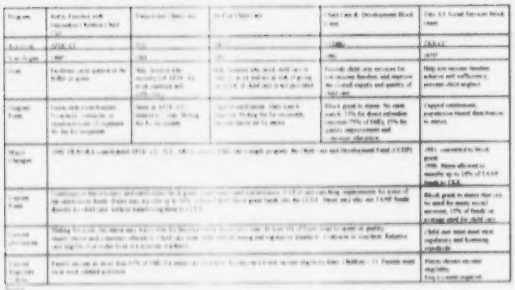

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Table 2:
Federal and State Expenditures and Children Served
by Major Means-Tested Child Care Subsidy Programs

	TXX-CC	CCDF
	Expenditure (billions)	
FY1999	.285[a]	9.132[b]
FY1998		6.399[b]
FY1997	.370[d]	4.369[b]
FY1996	.352[d]	3.125[c]
FY1995	.414[d]	3.017[c]
	Children Served (millions)	
FY1999		1.760[e]
FY1998		1.531[e]
FY1997		1.248[f]
FY1996		
FY1995		1.445[g]

Notes: See Table 1 for definition of the program acronyms. Expenditures are given in current dollars to facilitate checking with the original sources. To convert expenditures to constant 1999 dollars using the Consumer Price Index, multiply dollar figures for 1995, 1996, 1997, and 1998 by 1.093, 1.062, 1.038, and 1.022, respectively.

Sources:

a. Http://www.cbpp.org/9-13-99bud.htm: 15 percent of 1.9 billion for TXX.

b. Computed by summing all federal and state expenditures on the CCDF, either directly or through transfers to TANF, using data from the Annual TANF Reports to Congress (http://www.acf.dhhs.gov/programs/opre/director.htm) and reports from the Child Care Bureau (http://www.acf.dhhs.gov/programs/ccb/policy1/statlist.htm).

c. Committee on Ways and Means (2000), p. 621.

d. Committee on Ways and Means (1998, p. 714, 720): 14.8 percent of total TXX funding of 2.800, 2.381, 2.500 for FY95, 96, 97.

e. http://www.acf.dhhs.gov/news/ccstudy.htm

f. Committee on Ways and Means (1998, p. 687).

g. http://www.acf.dhhs.gov/programs/ccb/data/1995.htm. Sum of AFDC, TCC, ARCC, and CCDBG.

Table 3: Characteristics of State Child Care and Development Fund Plans

State	Annual Income Eligibility Level	Income Eligibility as a percent of SMI	Proportion of eligible children served	Monthly income at which maximum fee is required	Fee waived for Families below Poverty Line	Minimum Fee (full-time rate)	Maximum Family Fee (full-time rate)	Reimbursement Rate for Infant-Toddler Age Children	Total Federa and state ex enditure per eligible chil FY 1997
Alabama	$17,328	49%	.09	$1,858	Some	$5.00 /week	$72.50 /week	$82/week	444
Alaska	$38,244	85%	.11	$3,187	Some	3% of cost	75% of cost	$583/month	248
Arizona	$18,000	48%	.12	$1,500	Some	$.50 /day	$3.00 /day	$19.80/day	384
Arkansas	$18,401	60%	.05	$1,533	All	No fee	80% of fee	$16/day	174
California	$30,036	75%	.06	$2,149	All	$2.00 /day	$10.00 /day	$185/week	336
Colorado	$24,648	58%	.09	$2,000	Some	$176 /month	$200 /month	$20.43-23.13/ day	305
Connecticut	$39,168	75%	.06	$3,263	Some	No fee	$326.3 /month	$160/week	1091
D.C.	$35,580	85%	.12		None	$7/week	70% of fee	$90.75/week	687
Delaware	$20,124	56%	.12	$1,677	All	1% of cost	46% of cost	$21.10/day	966
Florida	$24,084		.07	$2,001	None	$.80 /day	$9.60 /day	$115/week	412
Georgia	$24,276	64%	.10	$2,023	Some	$5/week + $3/extra kid	$40/week + $20/extra kid	$85/week	396
Hawaii	$34,488	75%	.08	$2,874	All	0% of cost up to $350	20% of cost up to $280	$350/month	241
Idaho	$19,476	66%	.10	$1,623	Some	2% of cost	90% of cost	$400/month	167
Illinois	$21,816	50%	.13	$1,818	None	$2.00 /week	$55 /week	$31.99/day	692
Indiana	$25,332	64%	.04	$2,056	All	$0 /day	$10.00 /day	$42.25/day	393
Iowa	$20,664	52%	.06	$2,025	All	$0	$6/half-day	$11.50/half-day	335
Kansas	$25,404	66%	.06	$2,055	Some	$24	$223 /month	$2.51/hour	214
Kentucky	$17,724	56%	.15	$1,477	Some	$0	$8/day + .75/ day for >1 kid	$16/day	554
Louisiana	$29,580	85%	.16	$2,465	All	0	70% of cost	$13/day	117
Maine	$32,492	85%	.10	$2,708	Some	2% of gross income	10% of gross income	$128/week	296
Maryland	$22,440	46%	.08	$1,534	Some	$3.00	$209	$711/month	1028
Massachusetts	$33,252	67%	.15	$2,771	Some	$1.00 /week	$114 /week	$43/day	2615
Michigan	$26,064	59%	.17	$2,172	Some	5% of max rate	70% of max rate	$2.95/hour	643
Minnesota	$34,272	75%	.09	$2,856	Some	$22 /month	$491 /month	$125/week	272
Mississippi	$21,996	85%	.04	$1,833	Some	$10.00 /month	$153/month +$5/month/extra kid	$77/week	70
Missouri	$17,784	42%	.14	$1,482	Some	1per year	$4.00 /day	$17.50/day	593
Montana	$24,660	75%	.09	$2,055	Some	5	$308/15% co-pay	$16/day	161
Nebraska	$23,292	66%	.08	$1,333	All	$12 /month (two kids)	$334 /month (two kids)	$22.50/day	361
Nevada	$31,536	75%	.05	$2,628	Some	10% of cost of care	85% of cost of care	$5/hour	134
New Hampshire	$22,408	49%	.09	$1,869	Some	$0	$.50/week per child + 34% of daily cost of care	$18/day	760
New Jersey	$26,660	52%	.09	$2,777	None	$0.10 /month	$294.90 /month	$123.40/week	508

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New Mexico	$23,412	75%	12	$2,278	Some	$0	$116 plus 19% of income over $1,150	$18/day	168
New York	$26,964	65%	18	$2,247	Some	$26/week	$91/week	$43/day	575
North Carolina	$28,092	75%	18	$2,341	Some	9% of cost of care	9% of cost of care	$368/month	394
North Dakota	$29,340	82%	11	$2,445	Some	10% of cost of care	10% of cost of care	$2.15/hour	106
Ohio	$20,004	51%	10	$2,055	Some	$15	10% of family's adjusted monthly income	$105.00/week	837
Oklahoma	$27,696	85%	21	$1,500	Some	$2.00 /month	$201 /month	$303/month	359
Oregon	$33,012	85%	08	$2,087	Some	$25	$632	$495/month	234
Pennsylvania	$31,320	74%	14	$2,610	Some	$5.00	65	$29/day	393
Rhode Island	$24,660	58%	15	$2,055	Some	$5/week	$23/week	$98/week	819
South Carolina	$16,224	44%	09	$1,893	None	$11 /week	$11 /week	$67/week	257
South Dakota	$20,004	56%	08	$2,055	All	% of cost of care	5% of cost of care	$1.80/hour	230
Tennessee	$19,464	55%	16	$2,111	Some	$5 to $9 (for two children)	$32 to $56 (for two children)	$72/week	560
Texas	$27,480	75%	07	$3,000	Some	$27 to $33 (for two children) /month	270 to $330 (for wo children) /month	$22.53/day	179
Utah	$21,108	56%	10	$1,759	Some	$10 to $15 (for wo children)	255 to $281 (for wo children)	$18/day	588
Vermont	$25,920	80%	14	$2,160	All	of the cost of care	0% of cost of care	$18.84/day	946
Virginia	$22,668	54%	07	$1,889	Some	10-12% of gross income (two or more children)	10-12% of gross income (two or more children)	$177/week	441
Washington	$23,328	56%	13	$1,944	None	$10	$392	$31.82/day	655
West Virginia	$18,744	75%	24	$1,562	Some	$15 /day	8.00 /day	$13/day	615
Wisconsin	$21,996	53%	07	$2,348	None	$0.00 /week	01 /week	$5.34/hour	530
Wyoming	$17,736	42%	10	$1,334	None	$.05 per hour per child	.50 per hour per child	$2.50/hour	553

Note: Florida computes eligibility as a percent of the poverty level rather than state median income.

Source: http://www.acf.dhhs.gov/programs/ccb/programs/plan/index.htm. Figures in the last column were computed from expenditure data in the First Annual TANF Report to Congress (http://www.acf.dhhs.gov/programs/opre/director.htm) and reports from the Child Care Bureau (http://www.acf.dhhs.gov/programs/ccb/policy1.s/atlist.htm). Number of eligible children for the last column and proportion of eligible children served are from http://www.acf.dhhs.gov/news/report.htm.

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Table 4: Summary of Studies of the Effect of the Price of Child Care on Employment of Mothers

Study	Data	Population	Employment	Price	Method	Elasticity
Anderson and Levine (2000)	SIPP 1990-93	child < 13	binary: LFP	total c.c. expenses per mother's hours worked	Probit; standard	Married,<13:-.30 Single, <13: -.47 Married, <6: -.46 Single, <6: -.58
Blau and Robins (1991)	NLSY 1982-86	child < 6	binary: employed in last 4 weeks	total c.c. expenses per hour of care	Probit; standard	.04*
Connelly and Kimmel (1999)	SIPP 1992-3	child < 6	Binary: LFP	expenditure per hour on primary arrangement of youngest child	Probit; standard[a]	Married: -.160 Single: -.316
Connelly (1992)	SIPP 1984	Married, child<13	binary: LFP	total c.c. expenses per mother's hours worked	Probit; standard	-.20
U.S. GAO (1994b)	NCCS 1990	child<13	binary: LFP	total weekly c.c. expenses	Probit; standard	Poor: -.50 Near poor: -.34 Not poor: -.19
Han and Waldfogel (1999)	CPS 1991-94	child < 6	binary: employed	total c.c. expenses per mother's hours worked (from SIPP)	Probit; standard	Married: -.19 Single: -.41
Hotz and Kilburn (1994)	NLS72, 1986	child < 6	employed	total c.c. expenses per hour of care	probit	-1.26
Kimmel (1998)	SIPP 1987	child < 13	binary: worked last month	total c.c. expenses per mother's hours worked	Probit; standard	Married: -.92 Single: -.22
Ribar (1992)	SIPP 1984	child < 15	employed	total c.c. expenses per hour of care	probit	-.74
Blau and Hagy (1998)	NCCS 1990	child < 6	employed	quality-adjusted location-specific price from provider survey	Multinom-ial logit	-.20
Blau and Robins (1988)	EOPP 1980	married, child < 14	employed	average location-specific weekly c.c. expenditure	Multinom-ial logit	-.34
Fronstin and Wissoker (1995)	NCCS 1990	child < 6	employed	average location-specific from c.c. provider survey	binary logit	Low-income area: -.45 High-income area: .06*
Ribar (1995)	SIPP 1984	married, child < 15	employed FT, employed PT	total c.c. expenses per hour	structural multinom-ial choice	Child<15: -.09 Child<6: -.09

Notes: a. Connelly and Kimmel (1999) focus most of their analysis on a model of non-employment, part-time employment, and full-time employment. An overall employment elasticity based on this model is not reported. An employment elasticity based on a standard employment probit is reported in the paper, and the source of the estimates given in the last column above, but the estimates from the which the elasticity is computed are not given in the paper. SIPP = Survey of Income and Program Participation. NLSY = National Longitudinal Survey of Youth. NCCS = National Child Care Survey. CPS = Current Population Survey. NLS72 = National Longitudinal Survey of the Class of 1972. EOPP = Employment Opportunity Pilot Projects.

* Underlying coefficient estimate on the price of care was statistically *insignificant* at the 10% level.

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Table 5: Distribution of Employment, Work-Related Activities, Welfare, and Child Care Subsidies

	All	Receives a CC subsidy	No CC subsidy
Percent employed	68.1	70.3	67.8
Percent in school	4.9	12.7	4.0
Percent unemployed	5.9	5.5	6.0
Percent in work-related activity	78.9	88.5	77.8
Percent on welfare	21.5	34.7	20.0
Percent received a child care subsidy in the past	3.9	18.2	2.3
Percent received welfare in 1996	35.6	43.1	34.7
Sample size	4,029	419	3,610

	Percent receiving a CC subsidy	
All	10.4	
	Yes	No
Employed	10.7	9.6
In school	26.9	9.5
Unemployed	9.7	10.4
Work-related	11.6	5.6

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On welfare	16.7	8.6

Source: Tabulations from the National Survey of America's Famil

Table 6: Descriptive Statistic

Variables	Mean (Std. Dev.)
Dependent Variables	
Subsidy	0.104 (0.30)
Work	0.681 (0.47)
In school	0.049 (0.20)
Unemployed	0.059 (0.24)
Work-related activity	0.789 (0.42)
Welfare	0.215 (0.41)
Explanatory Variables	
Mother's age	31.9 (6.9)
Race[a]	
Black	0.32 (0.47)
White	0.65 (0.48)
Mother is in good health	0.93 (0.25)
Hispanic	0.14 (0.35)
Mother's Education[b]	
12-15 years	0.73 (0.44)
16 + years	0.11 (0.32)
Region of Residence[c]	
Northeast	0.23 (0.42)
West	0.17 (0.37)
South	0.31 (0.46)
Presence of children[d]	
At least one child # 5 present	0.33 (0.47)
At least one child between 6-12 present	0.45 (0.50)
Lagged dependent variables	
Welfare in the past	0.29 (0.45)
Child care assistance in the past	0.039 (0.19)
State-level variables	
Unemployment rate for female workers (%)	5.19 (1.45)
Median income (/10000)	4.036 (0.65)
Percentage of children under age 5 living in poverty	21.9 (7.0)
Income eligibility limit for a child care subsidy (/median income)	63.9 (11.2)
Monthly income level at which maximum child care fee is charged (/1000)	2.289 (.386)
Weekly child care reimbursement rate for infant-toddlers (/100)	1.468 (0.51)
Job search required as a condition for welfare eligibility	0.32 (0.46)
Benefit reduction rate for welfare	0.54 (0.27)
Monthly income limit for welfare eligibility (/1000)	0.880 (0.37)
Number of observations	4,029

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Note: Standard errors are in parentheses
[a]Omitted category is other
[b]Omitted category is less than high school
[c]Omitted category is midwest
[d]Omitted category is the presence of at least one child in each age category

Table 7: Determinants of Receipt of a Child Care Subsidy

	Without Lagged Variables	With Lagged Variables
Received welfare in 1996		.074 (.011)
Received a child care subsidy after leaving welfare		.329 (.024)
Age	-.013 (.006)	-.0093 (.0059)
Age squared	.000155 (.000090)	.000116 (.000087)
Black	.052 (.029)	.038 (.028)
White	.036 (.028)	.036 (.027)
Hispanic	-.022 (.015)	-.022 (.014)
Good health	-.021 (.019)	-.016 (.018)
Education 12-15	.025 (.013)	.027 (.013)
Education 16+	.034 (.019)	.044 (.019)
Children aged 0-5 only	-.035 (.014)	-.023 (.013)
Children aged 6-12 only	-.091 (.013)	-.069 (.013)
Northeast	-.028 (.020)	-.022 (.019)
West	.016 (.022)	.001 (.021)
South	-.038 (.024)	-.041 (.023)
CCDF weekly reimbursement rate	-.00010 (.00014)	-.00011 (.00014)
CCDF income eligibility/SMI	.00040 (.00066)	.00013 (.00064)
Monthly income at which family pays maximum fee/1000	.0044 (.0232)	.0021 (.0225)
Unemployment rate	-.0039 (.0064)	-.0031 (.0062)
State median income (SMI)/1000	.0028 (.0024)	.0030 (.0022)
Percentage of children <5 in poverty	-.00086 (.00180)	.00067 (.00174)
Intercept	.295 (.161)	.141 (.156)

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R^2 (n)	.04 (4,029)	.10 (4,029)

Note: Robust standard errors are in parentheses.

Table 8: Effects of Receiving a Child Care Subsidy

Outcome:	Employed	In School	Unemployed	Work-related activity	On Welfare
OLS Estimates					
1. No state-level variables; no lagged dependent vars.	.05 (.02)	.08 (.02)	-.006 (.012)	.13 (.02)	.10 (.02)
2. State-level variables included[a]; no lagged dependent variables	.05 (.02)	.08 (.02)	-.005 (.012)	.12 (.02)	.10 (.02)
3. No state-level variables; lagged dependent variables[b]	.11 (.02)	.07 (.02)	-.019 (.013)	.16 (.02)	-.01 (.02)
4. Same as row 1, with Head Start cases classified as not receiving a subsidy	.06 (.02)	.08 (.02)	-.01 (.01)	.13 (.02)	.10 (.03)
2SLS Estimates					
5. Same as row 1; instruments are state dummies	-.25 (.21)	.33 (.10)	-.001 (.099)	.07 (.18)	.47 (.20)
6. Same as row 1; instruments are state characteristics[c]	.23 (.45)	.54 (.28)	- 23 (.24)	.54 (.42)	.13 (.64)

Notes: The complete results for the models in row 1 are given in the Appendix Table.

a. The state-level variables included in the outcome equations are the unemployment rate, median income, children in poverty, weekly child care reimbursement rate for infants and toddlers, and the income level at which the maximum fee is charged.

b. The lagged dependent variables are welfare participation in 1994, and receipt of a child care subsidy after leaving welfare since January 1995.

c. The identifying instruments are the unemployment rate, median income, children in poverty, weekly child care reimbursement rate for infants and toddlers, income level at which the maximum fee is charged, and the income eligibility limit for a child care subsidy divided by median income.

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Table 9

Coefficient Estimates and Simulations from a Multinomial Logit Model

Dependent Variable Category			Coef. (s.e.) on child care subsidy	Simulated effect of receiving a child care subsidy
Welfare;	Work		---	.067
No welfare;	Work		-.95 (.18)	-.018
Welfare	No work;	Other work-related activity	-.05 (.24)	.064
No welfare	No work;	Other work-related activity	-.85 (.28)	.004
Welfare	No work;	No other work-related activity	-1.38 (.24)	-.04
No welfare	No work;	No other work-related activity	-2.11 (.32)	-.078

Notes: The other regressors in the model are those shown in the appendix table. The simulations were computed by setting the child care subsidy variable to zero for all observations, computing the predicted probabilities, and averaging over the sample. This was repeated with the subsidy variable set to one for all observations. The figures reported are the change in the probabilities as the subsidy variable changes from zero to one.

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Appendix Table: Full Results from OLS Estimates of the Outcome Equations

Outcome:	Employed	In School	Unemployed	Work-related activity	On Welfare
age	.034 (.009)	-.010 (.005)	-.003 (.005)	.021 (.008)	-.034 (.008)
age squared	-.00042 (.00013)	.00011 (.00006)	.000025 (.000072)	-.00029 (.00012)	.00040 (.00012)
Black	.030 (.043)	-.029 (.026)	.045 (.02[illegible])	.046 (.043)	.008 (.044)
White	.064 (.041)	-.035 (.025)	.002 (.01[illegible])	.031 (.042)	-.093 (.043)
Hispanic	-.071 (.021)	-.015 (.010)	.022 (.012)	-.064 (.021)	.052 (.020)
Good health	.093 (.028)	-.004 (.13)	-.013 (.0[illegible])	.077 (.028)	-.024 (.027)
educ 12-15	.276 (.020)	.025 (.008)	-.052 (.014)	.249 (.021)	-.144 (.020)
Educ 16+	.342 (.028)	.017 (.012)	-.059 (.016)	.299 (.026)	-.190 (.024)
Children aged 0-5 only	.057 (.020)	.008 (.010)	.002 (.01[illegible])	.067 (.019)	-.083 (.019)
Children aged 6-12 only	.128 (.019)	.011 (.009)	-.012 (.0[illegible])	.127 (.018)	-.096 (.018)
Northeast	-.127 (.020)	.056 (.010)	.014 (.010)	-.057 (.017)	-.004 (.018)
West	-.088 (.022)	.047 (.011)	.010 (.010)	-.031 (.019)	.061 (.021)
South	-.049 (.019)	.019 (.007)	.030 (.01[illegible])	.0005 (.016)	-.098 (.016)
CC subsidy	.052 (.023)	.080 (.017)	-.006 (.01[illegible])	.127 (.017)	.100 (.024)
Intercept	-.330 (.154)	.234 (.082)	.146 (.0[illegible])	.050 (.144)	1.16 (.144)
R^2	.12	.04	.02	.10	.10

Notes: Sample size is 4,029. The estimates correspond to those in row 1 of Table 8.

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